CLEAN WATER ACT COMPLIANCE INSPECTION REPORT
U.S. ENVIRONMENTAL PROTECTION AGENCY, REGION 5

Facility:
BP Products North American, Inc., Whiting Refinery
2815 Indianapolis Blvd.
Whiting, Indiana 46394

Facility Coordinates:
41.6625, -87.4831

Facility Owner:
BP Products North America, Inc.

NPDES Permit:
IN0000108

Inspection Dates:
May 5, 2014 – May 9, 2014

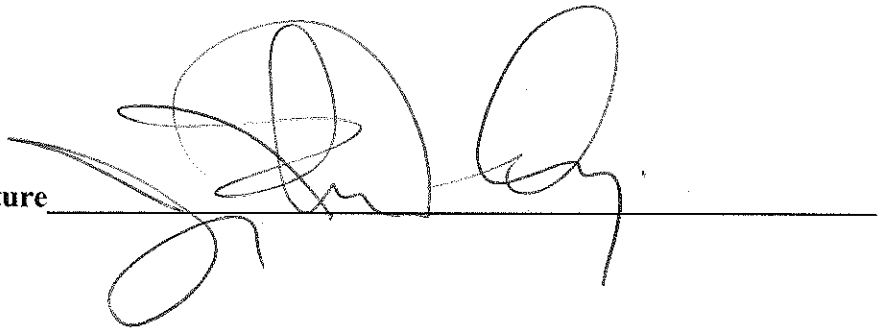
EPA Representatives:

Jeremy Deyoe, Environmental Engineer	(312) 353-8512
Keith Middleton, Environmental Engineer	(312) 886-6465
Michelle Heger, Environmental Engineer	(312) 886-4510

Report Prepared by:

Jeremy Deyoe, Environmental Engineer	(312) 353-8512

Report Date:
August 12, 2014

Inspector Signature 

Contents

FACILITY

BP Products North America, Inc. owns and operates the BP Whiting Refinery (BP or the refinery) at 2815 Indianapolis Boulevard in Whiting, Indiana, which is a petroleum refinery (North American Industry Classification System/ Standard Industrial Classification [NAICS/SIC] codes 324110/2911).

BP is located on the shores of Lake Michigan and has been in operation since 1889. The refinery and ancillary facilities are on approximately 1400 acres and operated 24 hours per day, seven days a week. BP employs approximately 1800 employees and contractors.

The refinery receives crude oil from a variety of pipelines from around the United States and Canada. BP has the capacity to process 420,000 barrels of crude oil per day. Crude oil is processed in pipestills and the distillate is separated into various process streams for further refinement. BP produces products such as gasoline, diesel, jet fuel, petroleum coke, fuel gases, propane, butane, asphalt, and xylene. The refinery ships over 15 million gallons of refined product off site each day via pipeline, barge, tank trailer, or rail car.

The refinery was recently upgraded to be able to run heavier crude oil. The Whiting Refinery Modernization Project (WRMP) included the construction of new process units including a crude distillation unit, coker, gas oil hydrotreater, and sulfur recovery unit.

Process wastewater is collected in a process sewer and sent to the Lakeside Wastewater Treatment Plant (WWTP or Lakeside). The WWTP has a current design treatment capacity of 32 Million Gallons per Day (MGD). The average dry weather flow to the treatment plant is 15 MGD. The WWTP also treats storm water in the refinery's process areas and remediation groundwater.

The refinery has a once through cooling water system that has a daily throughput of between 55 and 85 MGD. Once through cooling water is contained in a separate cooling water sewer system. Cooling water is sent to Lakeside via two separate sewer lines. Cooling water does not mix with process water at the WWTP.

BP has a separate sanitary sewer system that is not treated on site at Lakeside.

REGULATORY SUMMARY

BP is a petroleum refinery regulated under 40 Code of Federal Regulations (C.F.R.) Part 419, Petroleum Refining Point Source Category.

NPDES Permit IL0024767

The Indiana Department of Environmental Management (IDEM) issued BP a National Pollutant Discharge Elimination System (NPDES) permit, IN0000108 (Appendix A). The NPDES permit took effect on November 1, 2013 and expires October 31, 2018. The permit is based upon the permit application dated February 1, 2012. (Appendix B).

The NPDES permit authorizes the discharge of treated wastewater from outfall 005, once through cooling water from outfall 002, and storm water associated with industrial activity from outfalls 003 and 004. Treated wastewater from Lakeside is discharged to Lake Michigan via a 1300 foot long submerged discharge pipe with a 390 foot long diffuser. Once through cooling water is discharged at the breakwall adjacent to Lakeside into Lake Michigan. Storm water from outfalls 003 and 004 discharge to Lake George Branch of the Indiana Harbor Ship Canal (Lake George Canal). Effluent limits have been determined for each outfall and are identified in the permit with their associated monitoring frequencies.

Storm Water Pollution Prevention Plan

The Storm Water Pollution Prevention Plan (SWPPP) (Appendix C) requirements are described in Part I.D. and Part I.E. of the NPDES permit. The requirements in the permit that address the SWPPP requirements in the permit must be updated by 11/1/2014.

The current SWPPP, revision 5, dated 11/12/2013, applies to the J&L and Lake George areas of BP that contribute storm water flow to outfalls 003 or 004. The SWPPP is intended to comply with the requirements of BP's previous NPDES permit, which was effective 8/1/2007 through 10/31/2013.

Existing Enforcement Actions

BP is currently under an existing 2012 Consent Decree (CD), 2:12 CV 2007, with the United States and the State of Indiana. The CD requires that BP completely construct and install a new DAF and install new covers on seven separator by December 31, 2015.

BP is currently under an existing 1995 Resource Conservation and Recovery Act (RCRA) Corrective Action Agreed Order, Cause No. H-11187, with the State of Indiana. As required by the Agreed Order, BP completed and submitted, in December 1996, a preventative measures work plan, which included a schedule for implementation. The plan was approved by the Indiana Department of Environmental Management. According to the plan, BP is required to conduct regular monitoring and cleaning of the process sewer lines at the refinery until 2021.

ON-SITE INSPECTION SUMMARY

I presented credentials to BP representatives upon entry to BP on May 5, 2014. An opening conference was conducted with BP staff to discuss BP's processes and the NPDES permit. On May 5 to 9, 2014, BP staff provided process overviews of wastewater and storm water including a walkthrough of several areas of BP. A closing conference was held on May 9, 2014 to discuss preliminary inspection findings.

Water Intake

Lake Michigan is the water source for BP's process and once through cooling water. There are two intake water pumps which have chlorine added for zebra mussel control. Incoming water is sent to one of two water stations operated by BP's utility department where a portion is further treated through filtration. From the water stations, service water is sent to the refinery as once through cooling water, to the firewater system, or offsite to The City of Whiting or other companies.

Once Through Cooling Water System

Once through cooling water is not filtered prior to use in various processes at BP. After use, once through cooling water is sent to Lakeside for treatment in six separator. Six separator is not an American Petroleum Institute separator; it is a multiple cell retention basin with concrete underflows that separate each of the cells. At the time of the inspection, six separator contained an adsorbent boom and pads to collect and deflect oil for collection using vac trucks (Appendix H, Photos 10-13). Vac trucks were stationed at all times during the inspection to collect residual oil entering six separator. I observed sheen throughout six separator on each day of the inspection (Appendix H, Photo 9). I observed sheen enter the final cell of six separator prior to discharge, the sheen quickly dissipated due to the turbulence in the final cell (Appendix H, Photos 87 and 88).

The retention basin is designed with the capability to temporarily fill with water, reducing the discharge volume from outfall 002. At the time of the inspection, I observed that the retention basin had collected sediment. The sediment had built up in some areas and was approximately 2 feet below the water's surface, significantly reducing six separators capacity and reducing residence time.

A Slickwatch system is located at six separator's influent to monitor for the presence of oil (Appendix H, Photos 7 and 8). The Slickwatch system pulls samples every few seconds and uses laser diffraction to determine if oil is present on the surface of the cooling water. The Slickwatch system is attached to the Lakeside SCADA system. At the time of the inspection, sheen was observed in the Slickwatch system due to residual oil (Appendix H, Photo 8).

Sodium bisulfate is added to six separator's effluent to remove residual chlorine prior to discharge from outfall 002. Effluent from outfall 002 must meet a thermal discharge limit in addition to total residual chlorine, oil and grease, and total organic carbon (Appendix H, Photo 16). Samples for outfall 002 are pumped through a submerged tube in six separator's final cell to a sample collection sink, where the samples are collected.

Lakeside Wastewater Treatment System

Wastewater is produced at various refining processes and transported via a process sewer to Lakeside for treatment. The process sewer also collects storm water from the refinery process areas and contaminated groundwater for treatment at Lakeside. Crude desalter

brine is sent to the brine treatment unit (BTU) at Lakeside prior to combining with additional process wastewater at the WWTP.

Coagulant is added to the desalter brine prior to the BTU. After a temperature adjustment, a second coagulant is added along with a flocculant to the brine prior to being sent through one of three four stage dissolved nitrogen floatation (DNF) units operating in parallel. The brine is then mixed with other process wastewater prior to the WWTP bar screens.

The WWTP has primary, secondary, and tertiary treatment. Process wastewater, pre-treated brine from the BTU, storm water, contaminated groundwater, and vac truck discharges are mixed prior to entering the WWTP. The WWTP is being upgraded in response to the 2012 Consent Decree (Appendix E).

Wastewater enters the WWTP through bar screens, where caustic is added. A manually activated raking system is used on the bar screens. At the time of the inspection, the bar screen raking system was out of service for maintenance because it was permanently engaging. Waste collected by the raking system is collected in a dumpster and sent to the hazardous waste centrifuge. I observed spilled oily liquid under and around the dumpster (Appendix H, Photo 43). An oil skimmer pump at the bar screen is used to recover any free oil. Wastewater then flows into the grit chamber, which no longer operates. It is now only a large opening in the flow channel with a floating roof. I observed the floating roof was not straight and oily liquid was present on the roof. From the grit chamber, wastewater flows to an underflow weir where free oil is collected and sent to box 18 of the seven separator using an oil skimmer pump.

From the underflow weir, wastewater enters seven separator. Seven separator is the WWTP's oil water separator and is made up of three quads consisting of a total of 27 boxes, some of which are used for filter backwash, in the firewater system, and in the secondary treatment process. At the time of the inspection, only two of the three quads were operating, the third was undergoing maintenance to remove sludge from the boxes. Each active oil box being used as an oil water separator is a covered and sealed concrete basin with a concrete underflow dam to separate and collect free oil and settle solids. I observed at the time of the inspection that there was oily liquid on many of the rooftops (Appendix H, Photos 44, 45, and 49). Settled solids are collected in each quad and sent via an auger system to a sludge storage tank as hazardous waste. Free oil is collected and sent to the East and West Oil Sumps and returned to the refinery.

Effluent from seven separator's quads are combined in a sump and pumped to one of two equalization tanks, 5051 and 5052, operating in parallel. Each equalization tank has an oil skimmer that returns free oil to the refinery process sewer and then to the start of the WWTP (Appendix H, Photos 77 and 78). The WWTP's third equalization tank, 5050 is being constructed and will have a floating roof (Appendix H, Photo 79). BP representatives stated that seven separator will be removed and replaced with equalization tank 5050 to comply with the 2012 Consent Decree. Equalization tank 5050 will have a midline effluent point and collect free oil using surface oil skimmers.

Polymer is added to the effluent from the equalization tanks and flash mixed prior to the Dissolved Air Floatation (DAF) Units. The DAF consist of 7 units, one of which is dedicated to treating final filter backwash. The DAF units are each covered and sealed by floating covers. At the time of the inspection, I observed oily sludge material on the surface of the floating covers of each of the DAF units (Appendix H, Photo 50). Sludge collected from each DAF is sent to the sludge storage tank as hazardous waste. Effluent from the DAF units is combined in a sump and pumped to the secondary treatment system. To comply with the 2012 Consent Decree, a new Dissolved Nitrogen Flotation (DNF) will replace the DAF units.

I observed a leaking pump and pooled water adjacent to the DAF unit that had an adsorbent boom placed around it (Appendix H, Photo 39). The adsorbent boom was water soaked at the time of the inspection and was not an effective control. BP representatives stated that the leaking pump seal was not expected to be fixed since the DAF was going to be replaced.

Wastewater enters the secondary system into the first of two aeration tanks in series. The first tank has direct oxygen addition and surface aerators, while the second tank has surface aerators and channel aerators (Appendix H, Photos 55, 56, and 57). Phosphoric acid is added to the aeration tanks to provide nutrients in the biological system.

From the aeration tanks, wastewater flows into one of two clarifiers operating in parallel. Fire hoses were being used at the time of the inspection to knock down solids from the surface of the secondary clarifiers (Appendix H, Photos 58 and 59). BP representatives stated that this was a regular operational practice. The source of the water discharged from the fire hose was effluent return water or from BP's lake intake. I observed solids overflowing the weir from the clarifiers.

Activated sludge from the clarifiers is collected and Waste Activated Sludge (WAS) is sent to a sludge thickener tank and Return Activated Sludge (RAS) recycled to either of the two aeration tanks. From the thickener tank, WAS is sent to a belt press and the resulting filter cake landfilled as non-hazardous waste (Appendix H, Photo 53).

Effluent from the clarifiers is sent to tertiary treatment, which consists of 8 sand filters operated in parallel (Appendix H, Photo 60). At any time during operation, at least one sand filter is backwashing. Effluent from the filters is discharged to Lake Michigan via outfall 001 (Appendix H, Photo 17), used for makeup cooling water, or sent to the refinery firewater system.

Storm Water Associated With Industrial Activity

Outfalls 003 and 004 were both discharging at the time of the inspection. I observed foam in the waterway at the discharge from outfall 004 (Appendix H, Photo 141 and 142). The foam was contained inside of a boom that was placed around the discharge area (Appendix H, Photo 143). According to John Wigger, the boom was present to keep the sheen from the tramp oil, which is present in the Lake George Canal (Appendix H, Photo 148), from the outfall 004 discharge area.

I observed an area adjacent to outfall 004 which was being used to store drums of remediation purge water. BP representatives stated that the drums were empty (Appendix H, Photos 153, 155, and157).

Between outfalls 003 and 004, excavated material removed from the refinery for the Whiting Modernization Project was being stored in open piles (Appendix H, Photos 164, 165, 167, and 171). There was a concrete block barrier and silt fencing along the south edge of the piles (Appendix H, Photo 166 and 167). BP representatives stated that the material was being stored there and testing was needed to determine its final disposition. I observed erosional pathways from the excavated piles and pooled water at the base of the piles (Appendix H, Photos 167 and 171). The silt fencing was down and water was flowing between the concrete blocks (Appendix H, Photo 168). I walked and observed water flow from the pooled water inside the concrete block barrier to the Lake George Canal (Appendix H, Photos 168-183). I observed foam at the discharge point into the Canal (Appendix H, Photos184 and 185).

The marine dock, which transfers petroleum products between BP and barges, consists of several hundred feet of bulkhead along the Lake George Canal (Appendix H, Photo 95). At the time of the inspection, approximately 100 feet of bulkhead was being reconstructed along the east end of the marine dock (Appendix H, Photo 94). I observed an open propylene glycol drum with chemicals still present in the drum along the bulkhead (Appendix H, Photos 111 and 112). There were other chemicals, including paints and lubricants that were stored under a tent. The chemicals were exposed to and contacted flowing and dripping storm water as the tent did not reach the ground, nor did it prevent leakage from its roof (Appendix H, Photos 96 and 97). Storm water that flowed from the tent discharged between the old sheet pilings and new bulkhead (Appendix H, Photos 99-103).

I observed that storm water had ponded at various locations around the bulkhead and flowed to the west end of marine dock where I observed the discharge to the Lake George Canal (Appendix H, Photos 118-121). I observed sheen in the ponded water at the marine dock, at the discharge, and in the Lake George Canal (Appendix H, Photos 124-130).

I observed a discharge from behind the fire department garage gate on Indianapolis Boulevard into the street and to the City of East Chicago's storm sewer (Appendix H, Photos 63-71). The discharge occurred at the location where an existing, but nonoperational, hydraulic groundwater control system was located (Appendix H, Photos 190 and 191). According to BP representatives, the piping was going to be removed in the near future. The water had an orange/brown color and sheen (Appendix H, Photo 71). There were areas where the water could be seen bubbling from the ground (Appendix H, Photo 73). There was a very strong oil/hydrocarbon smell around the leaking area. BP security stated that the water was from a leaking wellhead and was identified in the fall of 2013, and the environmental department was informed of the issue.

I observed that the fire department garage area contained partially full chemical totes being used as a parking barrier (Appendix H, Photos 199-204). Employee's vehicles could back up or drive up to the totes.

BP representatives stated that storm water from the process areas of the refinery flows to the process sewer and is treated at the WWTP. I observed the ground was stained around the hazardous waste management area at the WWTP, which is managed by Heritage Environmental (Appendix H, Photo 28). I also observed areas of contained pooled waste at a hazard waste sample collection (Appendix H, Photos 26 and 27). I observed that there were locations of the collapsible wall containment structures in the hazardous waste area of the WWTP that were not standing and others that were supported by objects such as blocks and a fire extinguisher.

A second hazardous waste centrifuge area was located between the equalization basins (Appendix H, Photos 80-83). I observed spilled waste on the ground and pooled oily waste in a collapsible wall containment structure (Appendix H, Photo 81). There were sections of the collapsible wall that were not standing. I observed that there was a lack of controls to prevent the contamination of storm water around the centrifuge area.

I observed coke fines on the ground around the #2 coker (Appendix H, Photo 6). The fines were observed to have been transported away from the coker onto roads and gravel areas. Some fines were being hosed, by a constantly running garden hose, into a sewer that according to BP representatives flowed back to the coker.

Several cooling towers around the site had damage from ice over the winter, including the #7 cooling tower (Appendix H, Photo 2).

At various locations, I observed chemicals stored near storm water inlets and without containment (Appendix H, Photo 2), without identification labels (Appendix H, Photo 41) or near other incompatible chemicals (Appendix H, Photo 52).

Sampling

Compliance sampling is conducted at all outfalls. Sample collection and analysis is done by BP lab or environmental staff or by a contract lab, depending on the sampling location and parameter. BP's lab is ISO 9000.1 certified.

BP's Lakeside staff collects all samples at outfalls 002 and 005 with the exception of those for total residual chlorine (TRC), total mercury, and whole effluent toxicity (WET) analysis. Microbac collects and analyzes for TRC and total mercury. Environ, another contractor to BP, does the WET sampling and analysis.

Some samples that are collected by BP's Lakeside staff but are analyzed by Microbac. BP staff places these samples in a cooler and brings it to the visitor center on Indianapolis Boulevard for pickup by Microbac. The cooler is placed on a counter awaiting pick up in the visitor center where visitors wait and staff regularly walk (Appendix H, Photo 205). I

observed that the cooler is unlocked and can be accessed by anyone who passes through the visitor center.

Oil and grease samples from outfall 002 are collected from the final cell of six separator and sent through approximately 50 feet of tubing to a sink located in a small sampling building. Oil and grease samples are collected from the sink.

On May 8, 2014, I observed Microbac collecting TRC samples at the outfall 005 sample collection location. BP's two ISCO refrigerated autosamplers were both operating (Appendix H, Photo 21). Both autosamplers displayed a message that an error had occurred with sampling and an additional message to replace the tubing. This sampling was being conducted concurrently with an ISCO portable autosampler for WET testing Appendix H, Photo 20).

Discharge Monitoring Reports (DMRs)

Seven effluent exceedances were reported by BP since July 2010 and are identified in the following table.

Outfall	Parameter	Limit Timeframe	Reported Value	DMR Limit	Monitoring End Date
001	Total Suspended Solids (TSS)	Daily Max	7050 lbs/day	5694 lbs/day	7/31/2010
004	pH	Daily Max	9.3 Standard Units (S.U.)	9.3 S.U.	1/31/2010
005	BOD_5	Daily Max	14116 lbs/day	8164 lbs/day	4/30/2011
005	TSS	Daily Max	66362 lbs/day	7723 lbs/day	4/30/2011
005	TSS	Monthly Avg	14174 lbs/day	4925 lbs/day	4/30/2011
005	Oil and Grease	Daily Max	3263 lbs/day	2600 lbs/day	4/30/2011
005	Phosphorus	Daily Max	1.25 mg/l	1 mg/l	11/30/2011

SUMMARY OF FINDINGS

- A discharge from the fire department garage area into the City of East Chicago's storm sewer had been occurring since the fall of 2013 and was still occurring at the time of the inspection.
- Excavated material from the WRMP was stored in a manner which allowed contact with storm water and a subsequent discharge to the Lake George Canal.
- The marina area had a discharge of storm water with sheen to the Lake George Canal.
- The construction area of the marina had open containers of chemicals in contact with storm water which was flowing into an area between the new bulkhead and old sheet pilings.
- There were general housekeeping and maintenance issues identified during the inspection.
- The discharge from outfall 004 caused the accumulation of foam in the Lake George Canal.
- There was residual oil throughout six separator.
- Oil and Grease samples for outfall 002 were collected through a long tube and not directly in the jar used for analysis..
- There were areas of oily waste and stains on the gravel around the hazardous waste centrifuge and frac tanks.
- Custody was not being maintained for wastewater samples taken by BP staff and sent off site for analysis.

APPENDICES

Appendix A: NPDES Permit IN0000108, Effective 11/1/2013
Appendix B: NPDES Permit IN0000108 Renewal Application, Dated 2/1/2012
Appendix C: Revision 5 of SWPPP, Dated 11/12/2013
Appendix D: NPDES Permit IN0000108, Effective 8/1/2007
Appendix E: 2012 Air Division Consent Decree, 2:12 CV 2007
Appendix F: 1995 RCRA Corrective Action Agreed Order, Cause No. H-11187
Appendix G: Preventative Measures Work Plan, Dated 12/1996
Appendix H: 5/5/2014 – 5/9/2014 Inspection Photo Log